

Application No. 10/599,807
Amendment dated July 13, 2010
Reply to Office Action dated March 23, 2010

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (withdrawn/currently amended): Use of glass compositions with antimicrobial and/or disinfectant effect in materials for tooth restoration, excepting implants, in the field of fillings, wherein the filling is a material selected from the following group:

a composite material

a glasionomer cement

a compomer,

wherein the glass composition comprises the following components (in percentage by weight on an oxide basis)

SiO ₂	0 – 99.5 percent by weight
P ₂ O ₅	0 – 80 percent by weight
SO ₃	0 – 40 percent by weight
B ₂ O ₃	0 – 80 percent by weight
Al ₂ O ₃	0 – 30 percent by weight
Li ₂ O	0 – 30 percent by weight
Na ₂ O	0 – 40 percent by weight
K ₂ O	0 – 30 percent by weight
CaO	0 – 25 percent by weight
MgO	0 – 15 percent by weight
SrO	0 – 30 percent by weight
BaO	0 – 40 percent by weight
ZnO	0 – < 15 percent by weight
TiO ₂	0 – 10 percent by weight

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ZrO ₂	0 – 15 percent by weight
CeO ₂	0 – 10 percent by weight
Ag ₂ O	0.01 – 5 percent by weight
F	0 – 70 percent by weight
[[J]] I	0 – 10 percent by weight
Fe ₂ O ₃	0 – 5 percent by weight

and if necessary trace elements and/or normal refining agents in commodity quantities, wherein the sum of SiO₂ + P₂O₅ + SO₃ + B₂O₃ + Al₂O₃ is greater than 20 percent by weight and a maximum of 99.5 percent by weight and the sum of ZnO + Ag₂O + CuO + GeO₂ + TeO₂ + Cr₂O₃ > 0.01 percent by weight.

2. (withdrawn/currently amended): Use of glass compositions with antimicrobial and/or disinfectant effect in materials for tooth restoration, excepting implants, wherein the glass composition comprises the following components (in percentage by weight on an oxide basis):

SiO ₂	0 – 99.5 percent by weight, preferably 0 – 80 percent by weight
P ₂ O ₅	0 – 80 percent by weight
SO ₃	0 – 40 percent by weight
B ₂ O ₃	0 – 80 percent by weight
Al ₂ O ₃	0 – 30 percent by weight
Li ₂ O	0 – 30 percent by weight
Na ₂ O	0 – 40 percent by weight
K ₂ O	0 – 30 percent by weight
CaO	0 – 25 percent by weight
MgO	0 – 15 percent by weight
SrO	0 – 30 percent by weight
BaO	0 – 40 percent by weight
ZnO	0 – < 15 percent by weight, preferably 5 - < 15 percent by weight
F	0 – 65 percent by weight

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[[J]] I	0 – 10 percent by weight
Fe ₂ O ₃	0 – 5 percent by weight
Ag ₂ O	0.01 – 5 percent by weight

and if necessary trace elements and/or normal refining agents in commodity quantities, wherein the sum of SiO₂ + P₂O₅ + SO₃ + B₂O₃ + Al₂O₃ is greater than 20 percent by weight and a maximum of 99.5 percent by weight, in particular a maximum of 80 percent by weight.

3. (withdrawn): Application according to claim 1 in coating, filling or veneering materials for ceramic dental superstructures.

4. (withdrawn): Application according to claim 1, characterized in that the glass composition comprises ZnO in the range of 0.25 to < 15 percent by weight, preferably 2.5 to 10 percent by weight.

5. (withdrawn): Application according to claim 1, characterized in that the glass composition comprises Ag₂O in the range of 0.05 to 2 percent by weight, in particular preferably 0.5 to 2 percent by weight.

6. (withdrawn): Application according to claim 1, characterized in that the sum BaO + SrO is greater than 10 percent by weight.

7. (currently amended): Ion-releasing glass composition with antimicrobial effect for application as materials for tooth restoration, in particular in materials for fillings, in combination with materials for fillings, in particular selected from glasionomers, composites, compomers, wherein the glass composition comprises the following components (in percent by weight on an oxide basis):

P ₂ O ₅	> 66 – 80 percent by weight
SO ₃	0 – 40 percent by weight

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B ₂ O ₃	0 – 1 percent by weight
Al ₂ O ₃	> 6.2 – 10 percent by weight
SiO ₂	0 – 10 percent by weight
Li ₂ O	0 – 25 percent by weight
Na ₂ O	9 – 20 percent by weight
CaO	0 – 25 percent by weight
MgO	0 – 15 percent by weight
SrO	0 – 15 percent by weight
BaO	0 – 15 percent by weight
ZnO	0 – < 15 percent by weight
Ag ₂ O	0 – 5 percent by weight
CuO	0 – 10 percent by weight
GeO ₂	0 – 10 percent by weight
TeO ₂	0 – 15 percent by weight
Cr ₂ O ₃	0 – 10 percent by weight
[[J]] I	0 – 10 percent by weight
F	0 – 3 percent by weight

wherein the sum of ZnO + Ag₂O + CuO + GeO₂ + TeO₂ + Cr₂O₃ + [[J]] I > 0.01 percent by weight.

8. (withdrawn/currently amended): Ion-releasing glass composition with antimicrobial effect for application as materials for tooth restoration, in particular in materials for fillings, in combination with materials for fillings, in particular selected from glasionomers, composites, compomers, wherein the glass composition comprises the following components (in percent by weight on an oxide basis):

P ₂ O ₅	> 66 – 80 percent by weight
SO ₃	0 – 40 percent by weight
B ₂ O ₃	0 – 1 percent by weight

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Al ₂ O ₃	0 – 3.9 percent by weight
SiO ₂	0 – 10 percent by weight
CaO	0 – 25 percent by weight
MgO	0 – 15 percent by weight
SrO	0 – 15 percent by weight
BaO	0 – 15 percent by weight
ZnO	0 – < 15 percent by weight
Ag ₂ O	0 – 5 percent by weight
CuO	0 – 10 percent by weight
GeO ₂	0 – 10 percent by weight
TeO ₂	0 – 15 percent by weight
Cr ₂ O ₃	0 – 10 percent by weight
[[J]] I	0 – 10 percent by weight
F	0 – 3 percent by weight

wherein the sum of ZnO + Ag₂O + CuO + GeO₂ + TeO₂ + Cr₂O₃ + [[J]] I > 1 percent by weight.

9. (withdrawn/currently amended): Ion-releasing glass composition with antimicrobial effect for application as materials for tooth restoration, in particular in materials for fillings, in combination with materials for fillings, in particular selected from glasionomers, composites, compomers, wherein the glass composition comprises the following components (in percent by weight on an oxide basis):

P ₂ O ₅	> 45 – 90 percent by weight
B ₂ O ₃	0 – 60 percent by weight
SiO ₂	0 – 40 percent by weight
Al ₂ O ₃	0 – 20 percent by weight
SO ₃	0 – 30 percent by weight
Li ₂ O	0 – 0.1 percent by weight
Na ₂ O	0 – 0.1 percent by weight

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K ₂ O	0 – 0.1 percent by weight
CaO	0 – 40 percent by weight
MgO	0 – 40 percent by weight
SrO	0 – 15 percent by weight
BaO	0 – 40 percent by weight
ZnO	0 – < 15 percent by weight
Ag ₂ O	0 – 5 percent by weight
CuO	0 – 15 percent by weight
Cr ₂ O ₃	0 – 10 percent by weight
[[J]] I	0 – 10 percent by weight
TeO ₂	0 – 10 percent by weight
GeO ₂	0 – 10 percent by weight
TiO ₂	0 – 10 percent by weight
ZrO ₂	0 – 10 percent by weight
La ₂ O ₃	0 – 10 percent by weight
Nb ₂ O ₃	0 – 5 percent by weight
CeO ₂	0 – 5 percent by weight
Fe ₂ O ₃	0 – 5 percent by weight
WO ₃	0 – 5 percent by weight
Bi ₂ O ₃	0 – 5 percent by weight
MoO ₃	0 – 5 percent by weight

wherein the sum of ZnO + Ag₂O + CuO + GeO₂ + TeO₂ + Cr₂O₃ + [[J]] I > 0.001 percent by weight.

10. (withdrawn/currently amended): Ion-releasing glass composition with antimicrobial effect for application as materials for tooth restoration, in particular in materials for fillings, in combination with materials for fillings, in particular selected from glasionomers, composites,

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compomers, wherein the glass composition comprises the following components (in percent by weight on an oxide basis):

SiO ₂	40 – 80 percent by weight
B ₂ O ₃	5 – 40 percent by weight
Al ₂ O ₃	0 – 10 percent by weight
P ₂ O ₅	0 – 30 percent by weight
Li ₂ O	0 – 25 percent by weight
Na ₂ O	0 – 25 percent by weight
K ₂ O	0 – 25 percent by weight
CaO	0 – 25 percent by weight
MgO	0 – 15 percent by weight
SrO	0 – 15 percent by weight
BaO	0 – 15 percent by weight
ZnO	0 – < 15 percent by weight
Ag ₂ O	0.01 – 5 percent by weight
CuO	0 – 10 percent by weight
GeO ₂	0 – 10 percent by weight
TeO ₂	0 – 15 percent by weight
Cr ₂ O ₃	0 – 10 percent by weight
[[J]] I	0 – 10 percent by weight
F	0 – 10 percent by weight

wherein the sum of ZnO + Ag₂O + CuO + GeO₂ + TeO₂ + Cr₂O₃ + [[J]] I ranges between 5 and 70 percent by weight.

11. (previously presented): Glass composition according to claim 7, characterized in that the glass composition comprises ZnO in the range of 0.25 to < 15 percent by weight, preferably 2.5 to 10 percent by weight.

12. (previously presented): Glass composition according to claim 7, characterized in that the glass composition comprises Ag_2O in the range of 0.05 to 2 percent by weight, preferably 0.5 to 2 percent by weight.

13. (previously presented): Glass composition according to claim 7, characterized in that the glass composition contains BaO and SrO and the sum of BaO + SrO is greater than 10 percent by weight.

14. (previously presented): Ion-releasing glass composition according to claim 7, characterized in that at least two vitreous phases are formed in the glass composition.

15. (original): Ion-releasing glass composition according to Claim 14, characterized in that in the glass composition at least two vitreous phases exhibit different compositions.

16. (previously presented): Ion-releasing glass composition according to claim 14, characterized in that the glass composition is a borosilicate glass composition.

17. (withdrawn/currently amended): Ion-releasing glass ceramic with antimicrobial effect for application as materials for tooth restoration, in particular in materials for fillings, in combination with materials for fillings, in particular selected from glasionomers, composites, compomers, wherein the base glass of the glass ceramic comprises the following components (in percent by weight on an oxide basis):

SiO_2	20 – 90 percent by weight
CaO	0 – 45 percent by weight
Na_2O	0 – 40 percent by weight
P_2O_5	0 – 15 percent by weight
Ag_2O	0.01 – 5 percent by weight
ZnO	0 – 20 percent by weight

wherein the sum of $\text{ZnO} + \text{Ag}_2\text{O} + \text{CuO} + \text{GeO}_2 + \text{TeO}_2 + \text{Cr}_2\text{O}_3 + [[J]]$ I is greater than 0.001 percent by weight.

18. (withdrawn): Ion-releasing glass ceramic according to Claim 17, characterized in that the crystalline main phases comprise alkali-alkaline earth -silicate and/or alkali-silicate and/or alkaline earth-silicate, excepting a glass ceramic with the sole crystalline main phase $1 \text{ Na}_2\text{O} \cdot 2 \text{ CaO} \cdot 3 \text{ SiO}_2$ and the main phase $\text{Na}_4\text{Ca}_3\text{Si}_8\text{O}_{16}(\text{OH}_2)$.

19. (previously presented): Method for the production of an ion-releasing glass composition according to claim 14, characterized in that the at least two phases are preserved by means of tempering in a temperature range $T_g \leq T \leq T_g + 300^\circ \text{ C}$, wherein T_g is the transformation temperature of the glass.

20. (withdrawn): Method for the production of an ion-releasing glass composition according to claim 17, characterized in that the base glass for the glass ceramic is ground and subsequent to that a ceramizing of the powdery base glass takes place.

21. (withdrawn): Method for the production of an ion-releasing glass composition according to claim 17, characterized in that the base glass for the glass ceramic is ceramized first and is ground subsequent to that.

22. (withdrawn): Glasionomer cement for dental applications comprising:
a polymer which contains free carboxylic acid groups,
an ion-releasing glasionomer glass composition as well as an ion-releasing antimicrobial glass composition or
an ion-releasing antimicrobial glass ceramic according to claim 7.

23. (withdrawn): Glasionomer cement according to Claim 22 characterized in that 1 – 90 percent by weight of the total composition is an ion-releasing glass/glass ceramic composition, wherein the ion-releasing glass composition comprises an ion-releasing antimicrobial glass or an ion-releasing glass ceramic or is a mixture of ion-releasing glasionomer composition with an ion-releasing antimicrobial glass composition or an ion-releasing glass ceramic.

24. (withdrawn): Glasionomer cement according to claim 22, characterized in that the Ag_2O content > 0.01 percent by weight.

25. (withdrawn): Glasionomer cement according to claim 22, characterized in that the ratio of antimicrobial glass composition/glasionomer cement and/or fillings > 0.001.

26. (withdrawn): Glasionomer cement according to claim 22, characterized in that the ratio of antimicrobial glass composition/glasionomer cement and/or fillings < 200, preferably less than 100, quite preferably less than 10.

27. (withdrawn): Coating or veneering material for ceramic dental superstructures, comprising

a base material, preferably a filling, in particular selected from:

a composite material,

a glasionomer cement,

a compomer,

an ion-releasing antimicrobial glass composition or an ion-releasing glass ceramic

according to claim 7.